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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/523,780	02/08/2005	Hiromune Matsuoka	DK-US030323	5709

22919 7590 09/25/2007

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EXAMINER	
DELORM, TATIANA M	

ART UNIT	PAPER NUMBER
3744	

MAIL DATE	DELIVERY MODE
09/25/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/523,780	MATSUOKA, HIROMUNE	
	Examiner	Art Unit	
	Tatiana Delorm	3745	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *08 February 2005*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-9* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-9* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *08 February 2005* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

SUPPLEMENTAL ACTION

Claim Objections

1. **Claims 1-9** are objected to because of the following informalities:

In Claim 1, line 10, word "being" should be deleted;

line 11, "refrigerant" should be --the low pressure refrigerant--;

line 16, the phrase "saturation characteristics higher than R407C" should be --a saturation pressure characteristic higher than the saturation pressure characteristic for R407C--.

In Claim 2, line 10, word "being" should be deleted;

line 16, the phrase "saturation characteristics higher than R407C" should be --a saturation pressure characteristic higher than the saturation pressure characteristic for R407C--;

line 25, "low pressure refrigerant" should be --the low pressure refrigerant--;

line 29, "low pressure" should be --said low pressure--;

line 36, "said refrigerant" should be --said low refrigerant--.

Appropriated correction is required.

Claim Rejections - 35 USC § 112

2. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

3. **Claims 1 and 2 are rejected** under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 1, recites the limitation "at a maximum working pressure of 3.3 MPa or higher" in line 5. There is insufficient antecedent basis for this limitation in the claim.

Claim 1, recites the limitation "at a maximum working pressure of less than 3.3 MPa" in line 8. There is insufficient antecedent basis for this limitation in the claim.

Claim 2, recites the limitation "at a maximum working pressure of 3.3 MPa or higher" in line 35.

Claim 2, recites the limitation "at a maximum working pressure of less than 3.3 MPa" in line 30. There is insufficient antecedent basis for this limitation in the claim

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

5. **Claims 1, 4 and 5 are rejected** under 35 U.S.C. 103 (a) as being anticipated by Sami et al. (US 6,662,569) in view of Akira et al. (JP02002162126A).

Sami et al. disclose the invention substantially as claimed including a plurality of utilization units (24, 28), a vapor compression type refrigeration circuit (20; col. 2, lines 53-63); including a high pressure unit (22, 24, 26 and reversing valve - col.8, lines 62-64) with high pressure refrigerant (col. 3, lines 7-21; it is understood that the refrigerant with working fluid temperature at the condenser between 20C to 90C characterized by being high-pressure refrigerants such as R410A) and a low pressure unit (Sami et al. low pressure unit consists of: a suction *accumulator(col.* 2, line 59), a reversing valve and an inlet side of the compressor 22) with a low pressure refrigerant (col. 7, lines 7-21; it is understood that the refrigerant with working fluid temperature at the evaporator between -85C to 25C characterized by being low pressure refrigerants such as R410A), and a suction accumulator (col. 3, line 59) configured and arranged for pooling refrigerant that circulates inside said vapor compression type refrigerant circuit

(configured in suction/from low pressure side); and said refrigerant is azeotropic refrigerant such as R410A or R32 (col. 3, lines 7-21) which has saturated pressure characteristics higher than R407C.

Sami et al. do not explicitly disclose the maximum and minimum working pressure but that is an established characteristic of this reference as shown in the Akira et al. JP 2002-162126 (Toshiba Carrier Corp.), see translated pages 3, paragraph [0005]. Akira et al. teach that R410A refrigerant has pressure as high as about 1.5 times among HFC refrigerants compared with R22 refrigerant.

The applicant admits in the disclosure that the "standard working pressure is 2.0 MPa" and "a refrigerant having saturation pressure characteristics higher than R407C operates with pressure higher then 3.3 MPa (see page 6 of the specification).

Therefore, someone skilled in the art at the time of invention would have known to modify the system of Sami et al. for a maximum pressure for any given refrigerant, such as for R410a in order to optimize the resulting system performance.

6. **Claims 2-3 and 6-9 are rejected** under 35 U.S.C. 103(a) as being unpatentable over Sami et al. in view of Akira et al., and further in view of Sada. (US 5,526,649).

In regard to **Claims 2, 6 and 8**, Sami et al. discloses the invention substantially as claimed comprising a compressor (22) configured and arranged to compress low-pressure gas refrigerant and discharge high-pressure gas refrigerant (as seen in the illustration of Fig. 1; col. 1, lines 32-44; it is an inherent characteristic of the vapor compression cycle),

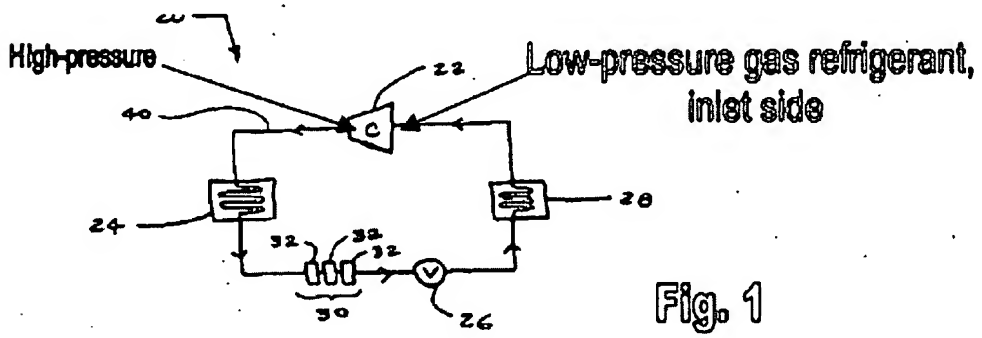

Fig. 1

said compressor (22) having an inlet side and a discharge side (Fig.l); a heat sours side heat exchanger (24) configured and arranged to operate as at least one of a condenser (24), said heat source side heat exchanger having a gas side (col. 2, lines 60-64); expansion mechanisms (26) connected between said utilization side heat exchangers (32) and said heat source side heat exchanger (24); a suction accumulator (col. 2, line 59), said accumulator being configured and arranged for pooling low-pressure refrigerant as a liquid refrigerant (configured in suction/from low pressure side); and the refrigerant is azeotropic refrigerant (col. 3, line 19; R410 is azeotropic refrigerant) having saturation pressure characteristics higher than R407C (R410A has higher

pressure characteristics than R407); said refrigerant includes R32, R410A (col. 3 line 19).

Sami et al. do not explicitly disclose the maximum and minimum working pressure but that is established characteristic of this reference as shown in the JP 2002-162126 (Toshiba Carrier Corp.) prior art, translated page 3, paragraph [0005]. Therefore, someone skilled in the art at the time of invention would have known to modify the system of Sami et al. for a maximum pressure for any given refrigerant, such as for R410a in order to optimize the resulting system performance.

Sami et al. do not explicitly disclose a plurality of utilization side heat exchangers mutually connected in parallel to each other, and how the switching mechanism is connected to the system; and accumulator that is connected between said switching mechanism and inlet side of said compressor.

Sada teaches a plurality of utilization side (3A; 3B) heat exchangers (32) mutually connected (see lines 4L and 4G) in parallel (see Fig. 1) and arranged to operate as an evaporator (32); a switching mechanism (22) configured and arranged for switching between a state (Fig. 1); and a suction accumulator (col. 2, line 59) connected between said switching mechanism and the said inlet side of said compressor (see Fig. 1); said accumulator (28) connected between said switching mechanism and inlet side of said compressor (Fig. 1, col. 12, lines 1-3), said accumulator (28) configured and arranged for pooling low-pressure refrigerant (LPS) as a liquid refrigerant, said switching mechanism and the inlet

side of the compressor forming a low pressure unit (as seen in the illustration of Fig.la);

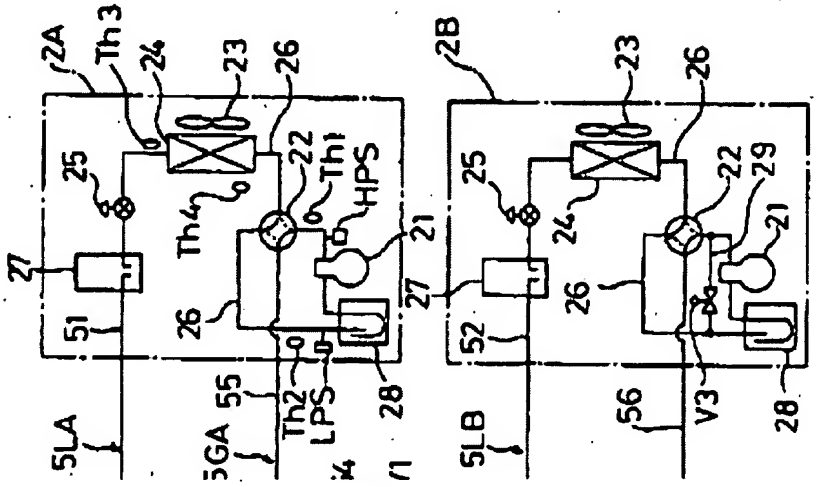

Fig. 1a

and the compressor, said heat source side heat exchanger, said plurality of utilization side heat exchangers, and said switching mechanism forming a high pressure unit (Fig. 1).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the system of Sami et al with the heat exchangers mutually connected in parallel in order to provide additional cooling and heating stability to the air conditioning space.

It would have further been obvious to one of ordinary skill in the art at the time the invention was made to modify the system of Sami et al with the

switching mechanism for the purpose of greatly increasing the cooling and heating efficiency and developing energy-efficient technologies for buildings.

It would have further been obvious to one of ordinary skill in the art at the time the invention was made to modify the system of Sami et al with the accumulator arranged as taught by Sada for the purpose of greatly increasing the cooling and heating efficiency and developing energy-efficient technologies for buildings.

In **regards to Claims 3, 7 and 9**, Sami disclose all the limitations of the claim 3 except for the temperature and high pressure detectors.

Sada teaches (Fig. 1; col., 12, lines 24-63) a heat source side temperature detector (Th 3) configured and arranged to detect a refrigerant temperature of heat exchangers (24; col. 12, line 35-37); a utilization side temperature detector (Th 5) configured and arranged to detect a refrigerant temperature on a liquid side of each of said utilization side heat exchangers (32; col. 12, lines 50-53); and a high pressure detector (HPS) configured and arranged to detect a refrigerant pressure (col. 12, lines 59-63) on Side of a compressor (22), based on detected values of said refrigerant temperature (Th 3, Th 5) and the refrigerant pressure detected by the heat source side temperature detector (Th 3), the utilization side temperature detectors (Th 5), and the high pressure detector (HPS), each of said expansion mechanisms (25, 33) having an opening that is regulated so that said liquid refrigerant (5LA) on said liquid side of said heat

source side heat exchanger (24) reaches a prescribed subcooled state when said heat source side heat exchanger (24) functions as a condenser, said opening of each said expansion mechanisms (25, 33) is regulated so that the liquid refrigerant on that liquid side of each said utilization side heat exchanger (32) reaches a prescribed subcooled state when said utilization side heat exchanger (32) functions as the condenser (see col. 12, lines 59-63. it is an inherent function of the expansion valve having Opening and closing positions based on detection signals from the sensors mentioned above that would allow the heat source to change its characteristics);

wherein said refrigerant that flows through said low pressure unit and said high pressure unit includes R32, R410A (col. 3, line 19).

Regarding the limitation a prescribed subcooling by the condenser, the examiner would like to explain that each and every condenser has its internal function to sub cool the refrigerant. Here the amount of subcooling by the condenser (24) is the prescribed subcooling.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the system of Sami et al. with the heat exchangers mutually connected in parallel and the control system as taught by Sada to provide a multi-type air conditioner system which can constantly maintain a refrigerant super-heat degree at an optimum state while keeping good

responsiveness against a change in state of the refrigeration cycle, thus enabling stable and efficient air conditioning.

Conclusion

7. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

- Morison (US 5,888,418) teaches an azeotropic refrigerant.
- Nakashima et al (US 4,771,610) teach a multiroom air conditioner
- Kubo et al. (US 5,263,333) teach a multi-type air conditioner system.

Contact Information

Any inquiry concerning this communication or earlier communications from the examiner should be directed to the examiner's supervisors, Cheryl Tyler 571-272-4834, or Frantz Jules at 571-272-6681. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-

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TMD 8/20/2007

FRANTZ JULES
SUPERVISORY PATENT EXAMINER